

What is claimed is:

1. A receive front-end module for use in conjunction with a transceive front-end module in a multi-band communication device, the communication device having at least
5 a first antenna and a second antenna electrically separated from the first antenna, wherein the transceive front-end module comprises a plurality of signal paths operatively connected to the first antenna for transmitting signals in at least a first transmit frequency band and a different second transmit frequency band, said receive front-end module comprising:
 - 10 a feed point, operatively connected to the second antenna for receiving communication signals in the communication device; and
 - a plurality of receive signal paths, operatively connected to the feed point for receiving communication signals in a plurality of frequency bands, wherein said plurality of frequency bands includes at least
 - 15 a first receive frequency band, which is partially overlapped with the first transmit frequency band in the transceive front-end module, and
 - a second receive frequency band, which is spaced from the first receive frequency band in frequency.
- 20 2. The receive front-end module of claim 1, wherein the first transmit frequency band comprises a frequency range substantially from 1850 MHz to 1910 MHz, and the first receive frequency band comprises a frequency range substantially from 1805 MHz to 1880 MHz.
- 25 3. The receive front-end module of claim 1, wherein the first transmit frequency band comprises a frequency range substantially from 1920 MHz to 1980 MHz, and the first receive frequency band comprises a frequency range substantially from 1930 MHz to 1990 MHz.
- 30 4. The receive front-end module of claim 3, wherein the second receive frequency band is partially overlapped with the second transmit frequency band.

5. The receive front-end module of claim 4, wherein the second transmit frequency band comprises a frequency range substantially from 1850 MHz to 1910 MHz, and the second receive frequency band comprises a frequency range substantially from 1805 MHz to 1880 MHz.

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6. The receive front-end module of claim 3, wherein the second receive frequency band comprises a frequency range substantially from 2110 MHz to 2170 MHz.

7. The receive front-end module of claim 5, wherein said plurality of receive
10 frequency bands further includes a third frequency band comprising a frequency range substantially from 2110 MHz to 2170 MHz.

8. The receive front-end module of claim 7, further comprising
at least one matching circuit, operatively connected to the plurality of receive
15 signal paths, for impedance matching.

9. The receive front-end module of claim 8, wherein the matching circuit comprises at least one capacitive element and one inductive element.

20 10. The receive front-end module of claim 8, wherein the matching circuit comprises at least one distributed element.

11. The receive front-end module of claim 7, further comprising a plurality of filters disposed in the plurality of signal paths for filtering signals in corresponding frequency
25 ranges.

12. The receive front-end module of claim 11, wherein the filters comprise surface acoustic wave filters.

30 13. The receive front-end module of claim 11, wherein the filters comprise bulk acoustic wave filters.

14. The receive front-end module of claim 11, further comprising:

a plurality of baluns, each balun disposed between the feed point and one of the filters.

15. The receive front-end module of claim 14, wherein at least one of the baluns
5 comprises an acoustic balun.
16. The receive front-end module of claim 14, wherein each of the baluns is integrated with a corresponding one of the filters.
- 10 17. The receive front-end module of claim 11, wherein at least one of the filters has a single-to-balanced function included therein.
18. The receive front-end module of claim 11, further comprising:
a balun having a first end operatively connected to the feed point and a second end
15 operatively connected to the filters.
19. The receive front-end module of claim 5, further comprising:
at least one isolation circuit, operative connected to at least one of the receive
signal paths, for providing cross-band isolation between the transmitted signals and the
20 received signals.
20. The receive front-end module of claim 19, wherein said isolation means comprises:
at least one switching element operatively disposed between the feed point and
said at least one of the receive signal paths for carrying out said isolation.
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21. The receive front-end module of claim 20, wherein said at least one switching element comprises a pin diode.
22. The receive front-end module of claim 20, wherein said at least one switching
30 element comprises a solid-state switching device.
23. The receive front-end module of claim 19, wherein said isolation circuit comprises:

a plurality of signal amplifiers disposed in the receive signal paths for isolating the communication signals.

24. The receive front-end module of claim 14, further comprising
5 at least one matching circuit, operatively connected to the feed point, for matching the filters.

25. A method of reducing reception loss in a portable communication device, the communication device having

10 a first antenna;
a second antenna electrically separated from the first antenna;
a plurality of transmit signal paths for transmitting communication signals in at least a first transmit frequency band and a different second transmit frequency band;
a plurality of receive signal paths for receiving communication signals in a
15 plurality of frequency bands, including at least
a first receive frequency band, which is partially overlapped with the first transmit frequency band, and
a second receive frequency band spaced from the first receive frequency band in frequency, said method comprising the steps of:
20 operatively connected the transmit signal paths to a first antenna; and
operatively connected the receive signal paths to the second antenna so that the communication signals in the first transmit signal band and the communication signals in the first receive signal band are conveyed via different antenna.

25 26. The method of claim 25, further comprising the step of
impedance matching the plurality of receive signal paths.

27. The method of claim 25, further comprising the step of
providing a plurality of filters in the plurality of receive signal paths for filtering
30 signals in corresponding frequency ranges.

28. The method of claim 27, further comprising the step of
providing a balun between the second antenna and each of said plurality of filters.

29. The method of claim 25, further comprising the step of
providing an isolation circuit in at least one of the receive signal paths for cross-
band isolation between the transmitted communication signals and received
5 communication signals.

30. The method of claim 25, further comprising the step of
providing a plurality of signal amplifiers in the plurality of receive signal paths for
cross-band isolation between the transmitted communication signals and the receive
10 communication signals.

31. A portable communication device, comprising:
at least a first antenna;
a second antenna electrically separating from the first antenna;
15 a transceive front-end module comprises a plurality of signal paths operatively
connected to the first antenna for transmitting signals in at least a first transmit frequency
band and a different second transmit frequency band; and
a receive front-end module comprising:
a feed point, operatively connected to the second antenna for receiving
20 communication signals in the communication device, and
a plurality of receive signal paths, operatively connected to the feed point for
receiving communication signals in a plurality of frequency bands, wherein said plurality
of frequency bands includes at least
a first receive frequency band, which is partially overlapped with the first transmit
25 frequency band in the transceive front-end module, and
a second receive frequency band, which is spaced from the first receive frequency
band in frequency.

32. The portable communication device of claim 31, comprising a mobile terminal.